Addressing Speculative Story point estimation in agile software development

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Abstract: Effort and time estimation at the initial stage of a software project is a difficult and challenging task due to volatility and changing customer requirements. Agile software development (ASD) methods are used by co-located as well as globally distributed teams in efficiently managing projects. Scrum remains the most popular iterative and incremental ASD framework. Effort estimation in scrum is mainly based on story points which are subjective measures and mostly lead to inaccurate estimates, resulting in increased cost. Our research evaluates various traditional and state-of-the-art techniques for Effort-Size (i.e., story points) and Effort-Time (i.e., ideal time) estimation. These techniques incorporate new research studies and deep learning advancements to reduce the misalignment between project expectations and project results. In ASD, project progress can be measured in sprint velocity and we have covered all aspects which could be utilized in SCRUM methodology with an emphasis on story points.

Methodologies are proposed to evaluate linear regression and scalar variability through size and time estimations of software effort. Humans tend to have larger standard deviation to the mean of size and time estimations (scalar variability effect) in wider ranges of issue. Estimations become noisier when ranges of the Actual Effort become bigger. An empirical evaluation demonstrates that our approach consistently outperforms three common baselines (Random Guessing, Mean, and Median methods) and six alternatives (e.g. using Doc2Vec and Random Forests) in Mean Absolute Error, Median Absolute Error, and the Standardized Accuracy.

Five Main References: